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Filiferous agaves

Colin C Walker

Filiferous agaves are plants that produce, usually white, fibres that peel off from the leaf edges. Seven of these are showcased here based on the author's experience of growing them, notable of which are *Agave schidigera* and *A. filifera*. A few additional species are also briefly introduced. Photos by the author unless otherwise stated.

Introducing filiferous agaves

Filiferous agaves form a group of attractive plants that are characterised by the production of fine or broad fibres or threads that peel off the leaf edges (margins). In contrast to many other agaves these do not produce prominent sharp teeth on their leaf margins, although occasionally small denticles are produced towards the leaf bases. Short sharp terminal spines are also produced which are dark when newly formed but turn grey with age. Another general characteristic leaf feature is the production of prominent bud-imprints which result from the new leaves being produced in tight buds.

To date there has been no satisfactory explanation provided to account for the production of the often

numerous threads on these plants, since unlike the prominent and often fierce marginal teeth and terminal spines produced by other agaves, the fibres of filiferous agaves are unlikely to deter herbivores from feeding on the plants.

All the agaves described and illustrated here produce unbranched spikes of flowers produced in spicate inflorescences. The species are not all closely related botanically and are currently classified into two different groups: *Agave* section *Littaea* and section *Parviflorae* (Thiede et al, 2019). These differ especially in their flower structure: members of section *Littaea* have larger flowers with relatively short tubes and have larger leaves (Gentry, 1982, who used the informal group name *Filiferae* for what is now section *Littaea*).



Fig. 1 The first published image of *A. schidigera* from Lemaire (1862)



Fig. 2 (left) *Agave schidigera* in a 25cm-diameter pot

Fig. 3 (below) *Agave schidigera* in habitat SE of Mezquital in the Mexican state of Durango (Photo: Zlatko Janeba)

To date none of my plants of filiferous agaves have flowered. Indeed Gentry (1982) observes that the *Littaea* “are long lived plants and do not flower frequently”. In contrast the *Parviflorae* “are notable for their small highly modified flowers” suggesting that “their specialised flowers indicate the relationship [to the *Littaea*] is not close”.

All the plants illustrated are relatively frost hardy and will survive winters in the UK in unheated glasshouses if kept completely dry. An exception here might be the variegated form of *Agave xleopoldii*. I personally have no experience of outdoor cultivation of any of these plants.



For further information, most species are discussed and illustrated by Starr (2012) and Pilbeam (2013).

Agave schidigera

Agave schidigera, *A. filifera* and *A. ×leopoldii* belong to section *Littaea*.

Agave schidigera Lemaire is the most filiferous species in my collection and my most favourite. The species was first described by the renowned French botanist Charles Lemaire (Lemaire, 1861) who later published an exceedingly attractive chromolithographic plate of the species (Lemaire, 1862), reproduced here as Fig. 1. Lemaire cleverly named this species, based on the Greek 'schidia' meaning 'brushed linen' and Latin '-gera' meaning 'carrying', for the fibres on the leaf margins.

Ullrich (1992) reassessed *A. schidigera*, *A. filifera* and related species, an outcome of which was that he reduced *A. schidigera* to a subspecies as *A. filifera* subsp. *schidigera* (Lemaire) B. Ullrich. Thiede (2001) questioned the lumping because it was not based on critical field studies and only adopted Ullrich's reclassification for pragmatic reasons. Starr (2012), however, accepted *A. schidigera* as a species distinct from *A. filifera* and this approach is followed here.

My largest specimen of *A. schidigera* is shown here (Fig. 2); it has a rosette 50cm diameter and 40cm tall. It has produced two offsets over the years which I have removed to maintain the symmetry of a single rosette. However, it is far from caespitose (clump-forming), unlike other members of this group, notably *A. toumeyana*. Leaves are up to 30cm long and 2.5cm at their widest at the base and are marked by white bud-imprints, although these do not form continuous lines. The terminal spines are quite prominent, strong and up to about 1cm long in my specimen, initially dark brown becoming grey as they age. It certainly lives up to its name since the leaf margins produce copious amounts of fibrous material. Indeed some of these fibres are relatively wide, being up to 4mm across and flat. These split and tear easily and are certainly analogous to narrow pieces of linen after which Lemaire named the species. In contrast the fibres of *A. filifera* are much finer and far more thread-like.

Agave schidigera has a wide-ranging distribution in Mexico: it occurs in northern Sinaloa and southern Chihuahua south to Michoacán and eastwards to San Luis Potosí (Gentry, 1982). Fig. 3 shows it growing in habitat in Durango where it usually forms solitary rosettes, unlike the caespitose and hence clumping *A. filifera*.



Fig. 4 *Agave filifera* in a 25cm-diameter pot

Agave filifera

Agave filifera Salm-Dyck is the most familiar species of the group illustrated here, having been first described in 1834. It is the archetypal filiferous agave, the feature after which it was named. A feature that distinguishes *A. filifera* from *A. schidigera* is that the former forms dense rosettes that offset profusely to form large clumps up to 1m or more across, making it easy to propagate and hence this species is fairly common in cultivation. In my largest plant (Fig. 4) the leaves are up to 20cm long and 2cm wide at the base, bearing white bud-imprints, and the margins produce fine thread-like fibres that readily peel away, hence the filiferous appearance is not so prominent as in *A. schidigera*. The leaf tips are armoured with spines up to 1.5cm, initially dark brown but turning greyish with age.

Starr (2012) distinguishes *A. filifera* from *A. schidigera* not only on the basis of the difference in offsetting but also in rosette size, with the former being smaller in all dimensions apart from the terminal spines which are longer.

Compared to *A. schidigera*, *A. filifera* has a more restricted natural distribution and appears to be relatively rare; Gentry (1982) never saw it in the wild. According to Ullrich (1992) it is restricted to the states



Fig. 5 *Agave xleopoldii* in a 30cm-diameter pan

of Michoacán, México and Hidalgo, but Starr (2012) also records it from Querétaro. So despite being common in cultivation, at least in Europe, it has been rarely collected from the wild and introductions appear to originate from a few 19th century collections.

Agave xleopoldii

Agave xleopoldii W. Watson featured as a 'Presidential potted plant' (Walker, 2018), but is included again here for completeness. This is a hybrid produced in cultivation in London nearly 150 years ago with the putative parentage: *A. filifera* × *A. schidigera*. Of the filiferous agaves in my collection this has the longest

and narrowest leaves, being up to 45×1cm. These are therefore outside the range given as typical for the proposed parents and I therefore suggested that *A. geminiflora* might have been one of its parents since this species has long, thin leaves. Whatever its origin, *A. xleopoldii* is a handsome plant with the white threads being particularly curly (Fig. 5). Unlike *A. filifera* it produces few offsets which I remove to maintain the symmetry of a single rosette and to provide propagating material. My largest plant is now 55cm in diameter and I suspect that it will not be long before it flowers. A feature I did not comment on previously is that the new leaves form a tight 'bud' that is angled to one side of the rosette.



Fig. 6 *Agave xleopoldii* 'Hammer Time' in a 18cm-diameter pan

***Agave xleopoldii* 'Hammer Time'**

This is the only variegated filiferous agave currently in my collection. It is similar to typical *A. xleopoldii* but differs in having pale green marginal stripes (Fig. 6) and in my limited experience it is, not unsurprisingly, a slower-growing plant. My plant is currently 25cm in diameter and readily produces offsets. This cultivar was named after Gary Hammer of the American nursery 'Desert to Jungle'.

Agave parviflora

Agave parviflora, *A. polianthiflora* and *A. toumeyana* belong to section *Parviflorae*.

Agave parviflora Torrey was named in 1859 from the Latin '*parvus*' meaning 'small', since at only 13–15mm long the flowers of this species are indeed the smallest produced by any species of *Agave*.

This species also has plants that are amongst the smallest of the agaves, making it suitable for collectors with limited space. Rosettes are up to 15cm tall and 20cm across (Fig. 7), often solitary or slowly offsetting rhizomatously. Its leaves are only up to 10cm long and 1cm wide, have prominent white bud-imprints and the margins are generously filiferous producing fine white often curly threads.

This species is closely related to *A. polianthiflora* from which it can often only reliably be distinguished by the

flowers. Those of *A. parviflora* have a short tube and are pale yellow, whereas those of *A. polianthiflora* have a long tube up to 45mm in length and are red or pink.

Agave parviflora has a limited distributional range from southern Arizona to northern Sonora, Mexico (Gentry, 1982).

Some significant variation has been identified in this species and two subspecies have been described that are endemic to Sonora. *Agave parviflora* subsp. *flexiflora* Gentry differs from the type in having downward flexed flowers. Described in 2011, *A. parviflora* subsp. *densiflora* G.D. Starr & T. Van Devender has larger rosettes up to 30cm across, larger leaves and flowers packed more closely together and hence its name. All these features make this a desirable plant, which I have yet to encounter in cultivation. Subspecies *densiflora* has a restricted distribution in east-central Sonora (Starr, 2012).

Agave polianthiflora

Agave polianthiflora Gentry is unique in the genus for its long red tubular flowers which have very short lobes reminiscent of those of the former genus *Polianthes* (now merged with *Agave*). Indeed Gentry (1972), when he described the species, said it was “unlike any other *Agave* I have observed”, particularly because the female part (the pistil) matures before the male anthers, whereas the converse usually occurs in *Agave*

flowers (which are therefore described as being protandrous).

The rosettes, however, are very similar to those of *A. parviflora*, being up to 20cm tall and 30cm across, solitary or more rarely offsetting. Small plants of both species are therefore especially difficult – if not nearly impossible – to tell apart when flowers are unavailable. Leaves are up to 20cm long and 1.3cm wide, with prominent white bud-imprints and margins that produce copious white fibres. This is a handsome, small-growing plant, here displayed in an attractive black glazed pot with white markings to complement the white fibrous leaf edges (Fig. 8).

Agave polianthiflora occurs in eastern Sonora then eastwards to central Chihuahua, Mexico (Gentry, 1982).

Agave toumeyana* subsp. *bella

Agave toumeyana Trelease was first named in 1920 after the American botanist Professor James Toumey.

This is the most proliferous of this group of agaves and offsets to form large clumps. I have only *A. toumeyana* subsp. *bella* (Breitung) Gentry, which differs from the typical subspecies *toumeyana* principally in having smaller rosettes of shorter leaves. My largest plant (Fig. 9) is about 36cm across and currently has around 30 rosettes. I acquired this plant about five years ago and it has grown steadily but not quickly since then, so I would not describe this as a fast-growing agave.

Leaves are up to 10cm long and 1cm wide at the base, bearing short sharp dark-brown terminal spines only up to 8mm long and small denticles at the base. It has moderately prominent white bud-imprints and the margins are modestly filiferous producing fine white threads. It is like a larger version of *A. parviflora* with a similar habit but the leaves are more pointed, the flowers are larger and most significantly, it produces far more offsets. Interestingly Gentry (1982) records *A. toumeyana* subsp. *bella* as producing fairy rings, in which the centre of a clump dies with age and the offsets spread outwards forming a circular clump. He estimated that some clones “probably exceed 100 years old”. My own plants certainly produce more dead leaves each year than any other filiferous agave, and of course I remove these leaves as much as possible, which for this



Fig. 7 *Agave parviflora* in a 9cm-diameter pot

particular plant come away relatively easily, to maintain tidy plants.

The subspecies *bella* was named for its beauty and whilst in my opinion the smaller-growing *A. parviflora* and *A. polianthiflora* make more appealing potted specimens, *A. toumeyana* subsp. *bella* is nevertheless an attractive plant.

Agave toumeyana is endemic to south-central Arizona, with subsp. *toumeyana* occurring in slightly more southerly locations compared with subsp. *bella* (Gentry, 1982).

Other filiferous agaves

In addition to the filiferous agaves already discussed based on my personal experiences of living plants, there are other related species of which I currently have no experience in cultivation. These include *Agave geminiflora*, *A. schottii*, *A. felgeri*, *A. multifilifera* and *A. colimana*, all of which, apart from *A. schottii*, belong to section *Littaea*.

Agave geminiflora (Tagliabue) Ker Gawler is the oldest known species of the group. Having been first described as *Littaea geminiflora* Tagliabue in 1816, it became an agave in the following year (when the genus *Littaea* was subsumed under *Agave* as a subgenus). Unlike most members of this group it forms a distinct stem as it matures. The leaves are arranged in a very dense rosette, are up to 60cm long but only 0.6–0.8cm across, making them especially dagger-like (Fig. 10). The leaves are flexible, pliable and bear very fine fibres unlike those of *A. schidigera*. *Agave geminiflora* is highly localised since its currently known distribution is limited to a small area in the Mexican state of Nayarit. It is named *geminiflora* for the paired flowers.

Agave schottii Engelman was first described in 1875 from what is now Arizona, but it is now known to have a wider distribution in Arizona, New Mexico and south into the Mexican state of Sonora. It has small rosettes and is densely caespitose. Its leaves have a narrow margin that produce sparse brittle threads (Thiede, 2001). The species was named for Arthur Schott who first collected it in 1855 whilst employed by the US Government working on the Mexican Boundary Survey (1851–1864).

The final three species to be considered were all named by the renowned agave expert Howard Scott Gentry. The first of these, *Agave felgeri* Gentry, has small, green to yellow-green, surculose (offsetting) rosettes forming rather dense clumps with rather few leaves. The leaves

are up to 35cm long, only faintly bud-imprinted, whilst the margins are only weakly filiferous (Gentry, 1972). This species is named for the American botanist Richard Felger.

Agave multifilifera Gentry has solitary non-offsetting green rosettes about 1m tall and 1.5m across with a short stem at maturity and the leaves are long and filiferous (Gentry, 1972). Indeed this species was named ‘*multifilifera*’ for the many fine threads produced on its leaf margins. This is the largest of the filiferous agaves and in cultivation produces stems up to 60cm long, hence this is not a plant for those of us with restricted greenhouse space! In Mexico it occurs in Sonora, Chihuahua, Sinaloa and Durango. Ullrich (1992) reduced *A. multifilifera* to a subspecies as *A. filifera* subsp. *multifilifera* (Gentry) B. Ullrich, differing mainly from the other subspecies he recognised by its larger dimensions (Thiede, 2001).



Fig. 8 *Agave polianthiflora* in a 14cm-diameter pot



Fig. 9 (left) *Agave toumeyana* subsp. *bella* in a 33cm-diameter pan

Fig. 10 (below) *Agave geminiflora* flowering in The World Garden, Lullingstone Castle, photographed during CactusWorld Live, September 2019



Finally, *A. colimana* Gentry produces solitary, short-stemmed non-offsetting rosettes to 60cm tall and 1.2m across. The leaves are up to 70cm long and have a narrow brown margin that is filiferous with fine, long brown threads unlike the typical white-cream threads produced by the other species. *Agave colimana* is typically distinctive with its elongate leaves and deep

narrow flower tube (Gentry, 1982). It was named after the Mexican state of Colima where it was first collected but it also occurs in Jalisco and Michoacán (Ullrich, 1992). However, Ullrich asserts that *A. ortgiesiana* Roez l dating from 1871 is an earlier name for *A. colimana*; this is as yet an unresolved issue.

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